

Reading Spark Plugs

Much information about engine and spark plug performance can be determined by careful examination of the spark plug. This information is more valid after performing the following steps.

1. Ride the ATC a short distance at full throttle in any gear.
2. Turn the ignition switch to OFF before closing the throttle and simultaneously shift to NEUTRAL; coast and brake to a stop.
3. Remove the spark plug and examine it. Compare it to the illustrations in Chapter Two:
 - a. If the insulator is white or burned, the plug is too hot and should be replaced with a colder one.
 - b. A too-cold plug will have sooty or oily deposits ranging in color from dark brown to black. Replace with a hotter plug and check for too-rich carburetion or evidence of oil blow-by at the piston rings.

- c. If the plug has a light tan or gray colored deposit and no abnormal gap wear or electrode erosion is evident, the plug and the engine are running properly.
- d. If the plug exhibits a black insulator tip, a damp and oily film over the firing end and a carbon layer over the entire nose, it is oil fouled. An oil-fouled plug can be cleaned, but it is better to replace it.

CONTACT BREAKER POINT IGNITION (ATC70, ATC90, 1979-1980 ATC110)

The following procedures describe breaker point adjustment and ignition timing. Breaker point replacement is described in Chapter Seven.

Gap Adjustment

The contact breaker point assembly is located on the left-hand end of the crankshaft next to the alternator on ATC70 models. On ATC90 and ATC110 models, the contact breaker point assembly is attached to the left-hand end of the camshaft in the cylinder head.

Contact breaker point adjustment is basically the same on all models. Where differences occur they are identified.

1. Place the ATC on level ground and set the parking brake or block the wheels so the vehicle will not roll in either direction.
2. Shift the transmission into NEUTRAL.
3. Remove the spark plug – this will make it easier to rotate the engine.
- 4A. On ATC70 models, perform the following:
 - a. Remove the recoil starter and left-hand crankcase (alternator) cover as an assembly.
 - b. Remove the bolts securing the recoil starter ring (**Figure 73**) and remove the ring from the alternator rotor.
- 4B. On ATC90 and ATC110 models, remove the screws (**Figure 74**) securing the ignition cover and remove the cover and the gasket. Remove the timing inspection cover on the left-hand crankcase cover.
5. Rotate the crankshaft with the nut on the alternator rotor counterclockwise until the point gap is at the maximum opening.
6. Insert a flat feeler gauge and measure the gap. The gap should be 0.3-0.4 mm (0.012-0.016 in.).
7. If the gap is not within these limits, loosen the contact breaker point attachment screw(s). Refer to A, **Figure 75** for ATC70 models or A, **Figure 76** for ATC90 and ATC110 models. Insert a screwdriver into the pry point (B, **Figure 75** or B, **Figure 76**) and move the point assembly until the gap is correct. Tighten the screw(s) securely.

NOTE

Make sure the point assembly does not move while tightening the screw(s).

NOTE

*Figure 75 is shown with the contact breaker point assembly and backing plate removed for clarity. **Do not** remove the assembly for this procedure.*

8. After tightening the screw(s), repeat Step 6 to make sure the gap is correct. Readjust if necessary.
9. Leave all components that were removed off for the next procedure.
10. Adjust the ignition timing as described in this chapter.

NOTE

*Ignition timing **must** be adjusted after the contact breaker point gap has been changed.*

Static Timing Adjustment (ATC70)

Static ignition timing is acceptable but if you have a stroboscopic timing light, dynamic timing (as described in this chapter) is more accurate.

This procedure requires a test light. It can be a homemade unit (Figure 77) that consists of 2 C or D size flashlight batteries and a light bulb mounted on a piece of wood, some light gauge electrical wire and alligator clips. These items can be purchased from any hardware store.

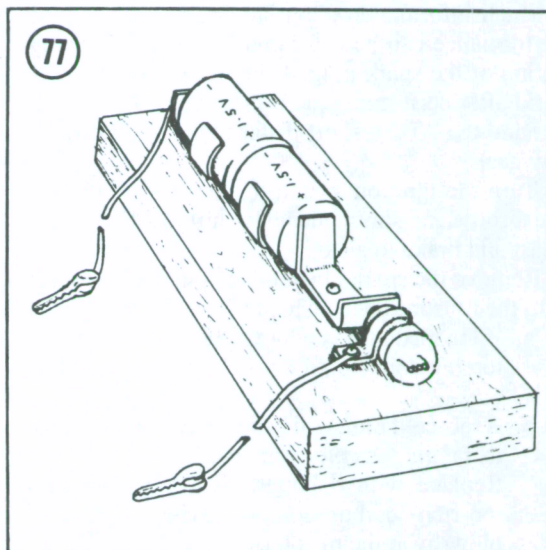
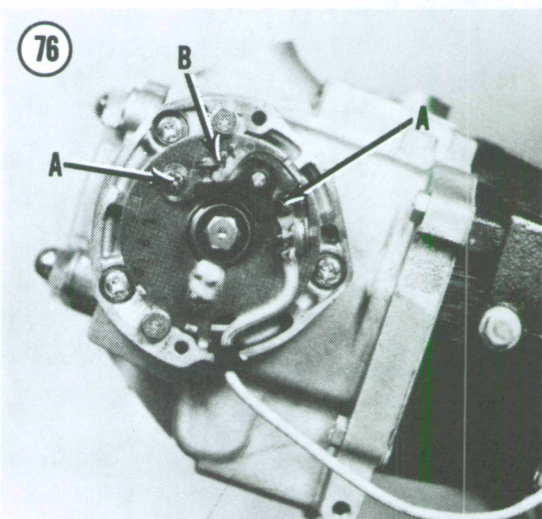
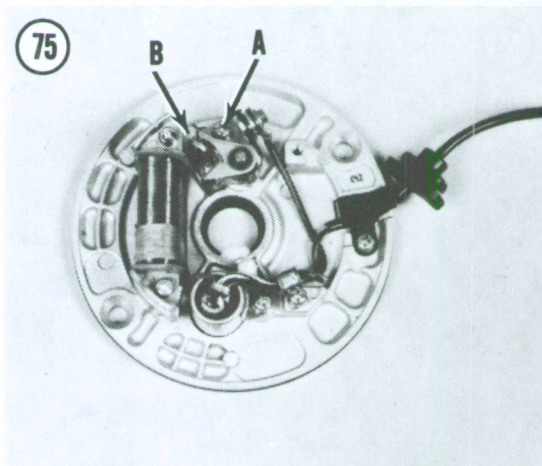
The following procedure is based on the test light shown in Figure 77. If another type is used, follow the manufacturer's instructions.

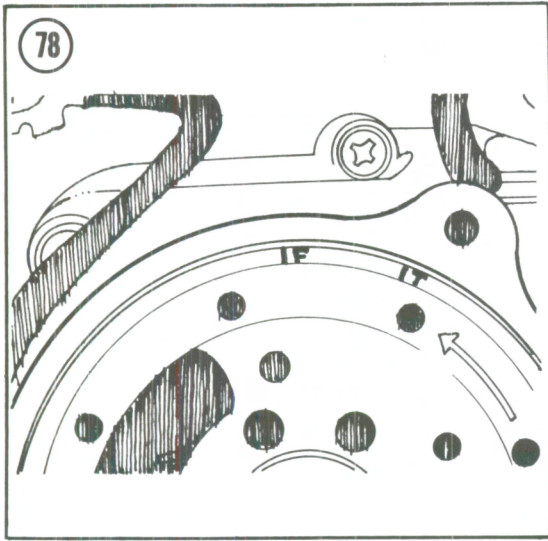
1. Adjust the contact breaker point gap as described in this chapter.
2. Disconnect the electrical connector from the alternator.

NOTE

Before attaching the test light unit, check the condition of the batteries by touching the test leads together. The light should go on. If not, replace the batteries and/or the light bulb and check all electrical connections on the tester. The test light must be operating correctly.

3. Connect one lead of the test light unit to a good ground, such as one of the cooling fins on the cylinder, and connect the other lead to the black wire in the electrical connector disconnected in Step 2. The test light should be on. If a commercial tester is used, follow the manufacturer's instructions.





4. Rotate the crankshaft with the nut on the alternator rotor *counterclockwise* until the "F" mark on the alternator rotor aligns with the fixed pointer (Figure 78). At this exact moment the contact breaker points should just begin to open. If they open at this moment, the test light will dim indicating that the ignition timing is correct. If the timing is incorrect, proceed to Step 5.

5. To adjust the timing, loosen the contact breaker point attachment screw (A, Figure 75). Insert a screwdriver into the pry point (B, Figure 75) and slightly move the point assembly until the breaker points just begin to open. The light will dim when the points open; tighten the screw securely. Make sure the point assembly does not move while tightening the screw.

NOTE

*Increasing the point gap will **advance** the timing. Decreasing the point gap will **retard** the timing.*

6. Repeat Step 4.

7. After the timing is correct, recheck the maximum point gap. Rotate the crankshaft with the nut on the alternator rotor *counterclockwise* until the point gap is at its maximum. Insert a flat feeler gauge and measure the gap. The gap should be 0.3-0.4 mm (0.012-0.016 in.). If the maximum gap cannot be maintained when the ignition timing is correct, the contact breaker point assembly is worn and must be replaced. Refer to Chapter Seven.

8. Install the recoil starter ring.

9. Install the recoil starter and left-hand crankcase (alternator) cover as an assembly.

10. Install the spark plug and spark plug lead.

Static Timing Adjustment (ATC90 and ATC110)

Static ignition timing is acceptable but if you have a stroboscopic timing light, dynamic timing (as described in this chapter) is more accurate.

This procedure requires a test light. It can be a homemade unit (Figure 77) that consists of 2 C or D size flashlight batteries and a light bulb mounted on a piece of wood, some light gauge electrical wire and alligator clips. These items can be purchased from any hardware store.

The following procedure is based on the test light shown in Figure 77. If another type is used, follow the manufacturer's instructions.

1. Adjust the contact breaker point gap as described in this chapter.

NOTE

Before attaching the test light, check the condition of the batteries by touching the test leads together. The light should go on. If not, replace the batteries and/or the light bulb and check all electrical connections on the tester. The test light unit must be operating correctly.

2. Connect one lead of the test light to a good ground, such as one of the cooling fins on the cylinder, and connect the other lead to the contact breaker point terminal. The test light should be on. If a commercial tester is used, follow the manufacturer's instructions.

3. Rotate the crankshaft with the bolt on the alternator rotor *counterclockwise* until the "F" mark on the alternator rotor aligns with the fixed pointer (Figure 79). At this exact moment the contact breaker points should just begin to open. If they open at this moment, the test light will dim indicating that the ignition timing is correct. If the timing is incorrect, proceed to Step 4.

4. To adjust the timing, loosen the contact breaker point base plate attachment screws (A, Figure 76). Insert a screwdriver into the pry point (B, Figure 76) on the outer perimeter of the base plate and slightly move the base plate assembly until the breaker points just begin to open. The light will dim when the points open; tighten the screws securely. Make sure the base plate assembly does not move while tightening the screws.

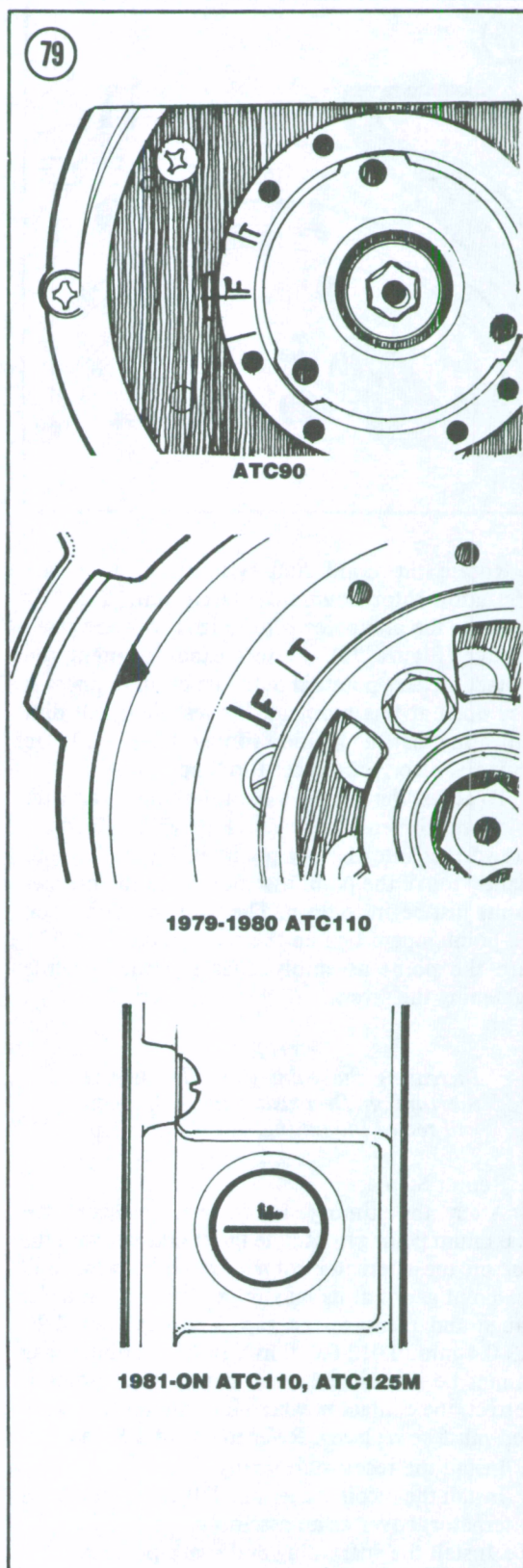
NOTE

*Rotating the base plate clockwise will **advance** the timing. Rotating the base plate counterclockwise will **retard** the timing.*

5. Repeat Step 3.
6. After the timing is correct, recheck the minimum point gap. Rotate the crankshaft with the bolt on the alternator *counterclockwise* until the point gap is at its maximum. Insert a flat feeler gauge and measure the gap. The gap should be 0.3-0.4 mm (0.012-0.016 in.). If the maximum gap cannot be maintained when the ignition timing is correct, the contact breaker point assembly is worn and must be replaced. Refer to Chapter Seven.
7. Install the ignition cover gasket and cover. Install the timing inspection cover on the left-hand crankcase cover.
8. Install the spark plug and spark plug lead.

Dynamic Timing Adjustment (All Models)

1. Perform *Gap Adjustment* as described in this chapter.
2. Start the engine and let it reach normal operating temperature. Turn the engine off.
3. Connect a portable tachometer and timing light following the manufacturer's instructions.
4. Restart the engine and let it idle at the following rpm:
 - a. ATC70: 1,500 \pm 100 rpm.
 - b. ATC 90 and ATC110: 1,300 \pm 100 rpm.
5. Adjust the idle speed, if necessary, as described in this chapter.
6. Shine the timing light at the alternator rotor and pull the trigger. The timing is correct if the "F" mark aligns with the fixed index mark. Refer to **Figure 78** or **Figure 79**.
7. If timing is incorrect, stop the engine and continue with this procedure.
- 8A. On ATC70 models, to adjust the timing, loosen the contact breaker point attachment screw (A, **Figure 75**). Insert a screwdriver into the pry point (B, **Figure 75**) and slightly move the point assembly:
 - a. Increasing the point gap will advance timing.
 - b. Decreasing the point gap will retard timing.
 Tighten the screw securely. Make sure the point assembly does not move while tightening the screw.
- 8B. On ATC90 and ATC110 models, to adjust the timing, loosen the contact breaker point base plate attachment screws (A, **Figure 76**). Insert a screwdriver into the pry point (B, **Figure 76**) on the outer perimeter of the base plate and slightly move the base plate assembly:
 - a. Rotating the base plate clockwise will advance timing.
 - b. Rotating the base plate counterclockwise will retard timing.





Tighten the screws securely. Make sure the base plate assembly does not move while tightening the screws.

9. Repeat Steps 4-6 and readjust if necessary until timing is correct.

10. Disconnect the timing light and portable tachometer.

11. Install all items removed.

SOLID STATE IGNITION (1981-ON ATC110; ATC125M)

The 1981-on ATC110 and 1984 ATC125M models are equipped with a capacitor discharge ignition (CDI) system. This system uses no breaker points, but timing does have to be checked to make sure that the base plate has not moved. Faulty ignition system components can also affect timing. This system's timing can only be checked dynamically—there is no static method. Dynamic timing requires a stroboscopic timing light as described in Chapter One. If timing cannot be adjusted correctly using this method, either the CDI unit or the alternator may be faulty and must be replaced; refer to Chapter Seven.

Before starting on this procedure, check all electrical connections related to the ignition system. Make sure all connections are tight and free from corrosion and that all ground connections are clean and tight.

1. Place the ATC on level ground and set the parking brake.

2. Start the engine and let it reach normal operating temperature. Turn the engine off.

3. Remove the timing mark hole cap (A, Figure 80).

4. Connect a portable tachometer and timing light following the manufacturer's instructions.

5. Restart the engine and let it idle at $1,500 \pm 100$ rpm. Adjust the idle speed if necessary as described in this chapter.

6. Shine the timing light at the timing window and pull the trigger (Figure 81). The timing is correct if the "F" mark aligns with the fixed index mark (Figure 79).

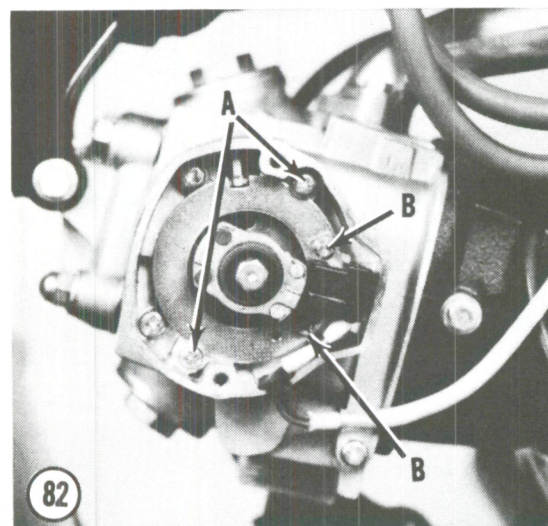
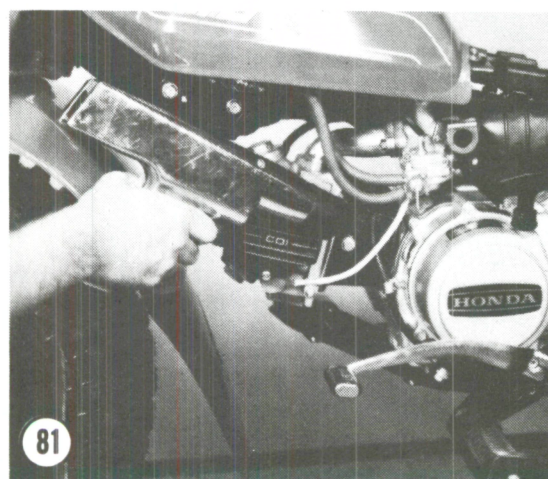
7. If timing is incorrect, perform the following:

a. Remove the screws securing the ignition cover (B, Figure 80) and remove the cover.

b. Loosen the base plate screws (A, Figure 82) and rotate the base plate in either direction. Tighten the screws.

c. Restart the engine and recheck the timing.

d. Repeat this step until the timing marks align.



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